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ABSTRACT

A study was conducted to compare electronic and traditional versions of a graduate-level research class. There were 73 participants in the electronic classes and 35 in the traditional classes, with a majority membership of white females enrolled in graduate education programs. Multiple choice pretests and posttests were administered to all groups. An analysis of covariance indicated that there was no statistically significant difference, at the 0.05 level, between the adjusted means of the two groups, suggesting that the electronic option allows for comparable learning outside the classroom. Attachments contain the course description and the analysis of covariance report.(Contains 26 references.) (Author/SLD)

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ED 415 274

Research by Electronic Mail

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Mid-South Educational Research Association

Annual Meeting

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Memphis, Tennessee

November 13, 1997

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Abstract

The purpose of the study was to compare electronic and traditional versions of a graduate-level research class. There were 73 participants in the electronic classes and 35 in the traditional classes, with a majority membership of white females enrolled in graduate education programs. Multiple choice pretests and posttests were administered to all groups. An analysis of covariance indicated that there was no statistically significant difference, at the 0.05 level, between the adjusted means of the two groups, suggesting that the electronic option allows for comparable learning outside of the classroom.

Research by Electronic Mail

When teaching, deciding how to communicate necessary information and skills can be a difficult task. Fortunately, by investigating the literature, one may find a wide variety of possible solutions to this dilemma. The purpose of this study is to document the use of an electronic method of teaching a graduate-level introductory research methods course. The literature yielded a wide range of approaches for teaching research, but only in the recent literature were purely electronic strategies found. Nevertheless, the related studies will be summarized, followed by a description of the electronic approach.

The strategies located ranged not only over time, but from the practical (Casciano-Savignano, 1977) to the theoretical (Koetting, 1994). They also cover a variety of topics: business (Flatley, 1996; Nantz and Drexel, 1995), computing (Pitt, 1996), English composition (Grasso, 1978; Marshall, 1978; Sherman, 1972; Warschauer, 1995), English education (Deal, 1995), library science (Ford, 1986; McCutcheon, 1990; Trzyna, 1986), psychology (Fago, 1996), sociology or social work (Gray & Meighen, 1980; Kirk & Kolevzon, 1978; Seidl, 1973; Thyer, Jackson-White, Sutphen, & Carrillo, 1992), and speech communication (Elmhorst, 1993; Lampton, 1970). Their focal points vary as well. Most of the studies were directed to stimulating student interest by making the course relevant to them, learning by doing, as it were: (Borg, 1986; Casciano-Savignano, 1977; Elmhorst, 1993; Fago, 1996; Ford, 1986; Grasso, 1978; Gray & Meighen, 1980; Lampton, 1970; McCutcheon, 1990; Rodrigues, 1979; Seidl, 1973; Sherman, 1972; Trzyna, 1986). A couple were dedicated to the content which should be covered in the course: (for example, Todd & Reece, 1990). Others were focused on ways the content could be delivered: (Kirk & Kolevzon, 1978; Thyer, Jackson-White, Sutphen, & Carrillo, 1992). Deal (1995), Garside (1996), McIntyre and Tlusty (1995), and Wang (1996) recommended the use of logs or journals to stimulate reflection and communication. Borg (1986), and Casciano-Savignano (1977) encouraged using computers for data analysis as part of the instructional package. Interestingly, Kirk and Kolevzon (1978) recommended teaching research methodology starting with computer-assisted data analysis, what they called teaching research "from Z to A". Fago (1996) implemented a method of developing psychological scales in a research class using electronic mail.

The orientation of the class involved in the studies varied also. Ford (1986), Koetting (1994), Lampton (1970), Marshall (1978), Thyer, Jackson-White, Sutphen, and Carrillo (1992), and Trzyna (1986) described teacher-centered designs while Borg (1986), Casciano-Savignano (1977), Fago (1996), and Sherman (1972) recommended student-centered research. Combining the approaches, Elmhorst (1993), Grasso, (1978), Gray & Meighen (1980), McCutcheon (1990), Rodrigues (1979), and Seidl (1973) endorsed a mix of teacher-centered and student-centered activities.

Although computer-assisted instruction was included in some of these techniques, only recently have studies mentioned the use of electronic mail as a means of conducting the course. For this study, a combination traditional/electronic research course was offered to graduate students enrolled in an introductory research methods course beginning in the Spring of 1995, with the latest offering of the course in the Spring of 1997. The students were allowed to select the delivery type they wanted. There were 73 participants in the electronic classes and 35 in the traditional classes, all predominantly white females enrolled in graduate education programs. The students who preferred the e-mail approach were generally somewhat knowledgeable about the use of computers and modems, but were helped with any difficulties they experienced in communicating this way. Passwords were provided free, as part of student fees, by the academic computing center for students who did not already have their own accounts or who preferred to use a student account.

The students who elected to continue with the traditional approach were still expected to actively participate in the learning process. One instructor taught using a three week cyclic rotation of activities. The first or second week the student was required to meet individually for 15 to 20 minutes with the instructor to discuss individual concerns and progress. The third week all of the students met in plenary sessions to critique assigned articles. Critiquing models for both proposals and completed papers were provided and used during these meetings. At each of these sessions, the students were invited to sign up

for individual consultation time during the next three-week cycle. After the first individual sessions, the requirements were relaxed somewhat, in that students could call the instructor by phone or visit during non-class hours instead. The other two instructors used the more common lecture approach with opportunities for discussion.

To determine whether the students were performing at least comparably with students taking the course in the more traditional fashion, pretests and posttests were given, similar in format to the regular tests administered to both groups as part of their course grades. An analysis of covariance (ANCOVA) was run using posttest scores as the response variable and pretest scores as the covariate. Since the ANCOVA technique involves features of both the analysis of variance and regression, assumptions for both were tested using the NCSS statistical program, version 6.0.21. The assumption of random selection is not practical for most courses, but the two groups were demographically comparable. Normality and homoscedasticity across all groups were verified using the Omnibus Normality of Residuals and Modified-Levene Equal-Variance tests. Homogeneity of regression was observed in scatterplots of both pretests and posttests and their trend lines. Therefore, the assumptions required for ANCOVA seemed to be reasonably well met.

The test indicated that the null hypothesis of no statistically significant difference between the traditional (adjusted mean of 12.49, n=35) and electronic (adjusted mean of 12.10, n=73) classes' scores could not be rejected at the 0.05 level [$F(1,105)=0.91$, $p=0.34$]. It is concluded, then, that offering the course through electronic mail did not appear to hinder the performance of the students, to the extent measured by the multiple-choice tests, suggesting that the electronic course offering provided a flexible alternative for learning. Students noted the possibility of some nonacademic advantages over the traditional approach, commenting on "flexibility", "quick responses", "personal quality", "self-paced, self-directed" learning, need for more courses by electronic mail, time savings by not having to commute, and interaction with classmates, among others. The responses from the students indicated that they believed that the experience was worthwhile. Overall, then, the electronic course offering seemed to provide a flexible alternative for learning, and the comparable posttest performances suggest that the e-mail approach allows an equivalent level of learning outside the classroom.

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UNIVERSITY OF ARKANSAS AT LITTLE ROCK
College of Education
Department of Educational Leadership
(revised 1/11/97)

I.	Course Prefix and Number	EDFN 7303, Section 02
II.	Course Title	Introduction to Research and its Applications
III.	Credit	3 hours
IV.	Semester and Year	Spring, 1997
V.	Instructor	Rob Kennedy, Ph.D., Associate Professor of Educational Foundations
VI.	Office Location	Larson 204B
VII.	Office Hours	By appointment
VIII.	Telephone	569-xxxx (UALR), 327-xxxx (home), rlkennedy@xxxx.edu (e-mail), rkennedy@xxxxx.xxxx.edu (e-mail)

IX. Course Description

Application of scientific method to educational research including nature of research problems in education, theory of research, experimental design, techniques in data gathering, and the interpretation of results. Research reporting and bibliographical techniques.

X. Course Objectives

Use and adapt findings from scientific research to applied settings

Comprehend and evaluate written reports of research in education and related areas of inquiry

Prepare technical reports of research, including rationale, methods, findings, and interpretation of results

Acquire and analyze information through reviewing research literature

Evaluate and employ a variety of measurement techniques in the context of conducting research

Demonstrate knowledge of professional literature

Additional course objectives:

Become familiar with the fundamentals of the research process through such procedures as identifying research questions, planning research projects, writing grant proposals, conducting research, and writing research papers.

Become familiar with the fundamentals of being consumers of research through such procedures as locating research materials; reading them for knowledge, understanding, application, analysis, and synthesis; and evaluating them on the basis of their development, execution, and delivery.

Develop skills through research efforts which will help in continuing learning on a lifelong, independent basis.

Develop leadership and research skills through learning independently and making decisions based on this research.

XI. Texts, Readings, and Instructional Resources

Required Text

Borg, W. R., & Gall, M. D. (1996). Educational research: An introduction (6th ed.). White Plains, New York: Longman.

Supplemental Reading

American Psychological Association. (1994). Publication manual of the American Psychological Association (4th ed.). Washington, D.C.: Author.

(See also Annotated Bibliography)

XII. Assignments, Evaluation Procedures, and Grading Policy

Course Requirements

Students who demonstrate a commitment to the course through attendance, participation, reading, studying, and otherwise applying themselves to the course will benefit in direct proportion to that effort. In other words, "You get out of it what you put into it."

All students are expected to write a grant proposal to a funding agency, either actual or generic. All students are also expected to review and critique proposals and papers, as well as to write and submit a one-paragraph bibliographic annotation of a research or grant text or article on a computer disk or through e-mail.

The "funding agency" for a generic proposal will be your instructor. You will use the generic grant application found in this outline. The "funding agency" for an actual proposal will be a source of your choosing. You will be expected to locate the funding source, request and obtain a grant application form from it, and complete it for submission to your instructor. A copy of the application form and its

instructions must accompany the copy submitted to the instructor to enable accurate assessment. You are strongly encouraged to submit the application to the actual funding agency. Please notify the instructor when you submit the document as well as provide documentation of the outcome. You should not pursue this option unless you have the time, resources, and commitment to administer the grant. A number of grants have been awarded to students in previous classes (See the section entitled "Some Funding Agencies to Consider.). The funder will expect you to carry out the project and provide it with a final report.

Consider also the research and grant-writing articles and texts listed in the annotated bibliography to help learn terms and concepts for better critiquing of proposals and papers and for preparation for the final.

Evaluation Techniques/Concepts Used for Grading

Work will be judged as to its acceptability by the instructor as determined by its quality and completeness (see models for proposals and papers). Work judged unacceptable may be corrected by the student and resubmitted if time permits. In other words, if you wait until the last class to submit your proposal, then I will only be able to grade your effort as it stands at that time. You will not have a subsequent opportunity to improve it, in this class.

Grant Proposal (24%)
Participation (16%)
Final examination (50%)
Bibliographic annotation (5%)
Attendance and completion of in-class exercises April 28/May 2 (5%)

Grant Proposal (24%)

You are expected to complete either a generic grant application using the proposal format provided in this outline, or an actual application from the funder of your choice.

In evaluating your research proposal, I will be looking for the required components, as well as for the overall quality of the proposal in terms of its professionalism. Your proposal should be prepared following the style of the American Psychological Association. Proper grammar, spelling, and punctuation, typing or word processing, and other aesthetic considerations are expected to be a part of your effort. The proposal should not only look good, but should read well. Proposals which do not meet these standards of professionalism will be considered unacceptable. If you submit your proposal on paper, please do not use covers or other binders. Simply paper clip the pages together to facilitate their being taken apart for review. At least one other person, preferably more, should review your proposal before it is submitted for evaluation, to check for readability and completeness. If the paper is satisfactory, you will receive full credit. If it is not, then I will tell you what you need to do to complete it, again, if there is time to do so.

Participation (16%)

Because the class is conducted almost entirely through electronic mail, it is your responsibility to maintain daily (or close to it) communication throughout the course by participating in class discussions and reading your e-mail. If you do not check your e-mail regularly you may miss important class information. Also, if you do not read regularly, you will quickly find yourself innundated with e-mail from class members.

You will have a three weeks (unless otherwise specified) to answer the questions from the "Critical Evaluation of the Proposal" and "Critical Evaluation of the Paper" instruments, respectively. So that the entire class may benefit, you will need to post these responses to EDFN730302 where they may be read by all of the class members. It is expected that each class member will critique each other's responses and comment accordingly, referring to a minimum of one other student's responses, per proposal or paper. The comments must be constructive in nature although you may have a differing opinion. Merely being critical, though, will earn no credit. The goal is to help each other learn, since the knowledge of the entire class can be incorporated, rather than just that of the instructor. If your critique is satisfactory then you will receive full credit (4 percentage points). If the critique is not satisfactory, then I will let you know what you need to do to complete it. I do expect the critiques to continually improve.

To discourage late submissions, which tend to confuse the rest of the class when it has moved on to the next paper, I will deduct 1 percentage point out of the 4 each critique is worth, for each day the work is late. If more than 4 days late, the critique will no longer receive credit. Please keep up!

Final Examination (50%)

The final exam is comprehensive, so regular studying of the text will be to your advantage. The questions and answers are included in the text, in the Self-Check Tests at the end of each chapter. The questions may require merely knowledge, the ability to apply information, or possibly synthesize or evaluate. The test is to help encourage you to learn the vocabulary and become familiar with the concepts of research so that you can do a credible job in the other aspects of this class as well as prepare you to be a beginning researcher. In addition, the test will likely cover more fully areas that are not as well addressed through the other activities. In that sense, it should be complementary to those activities.

I expect you to study the material in the text and then test yourself by taking the Self-Check Tests. If you do well, then you are making good progress. If you do not do well, then study more and continue the process until you feel satisfied that you are learning. Eventually you will know all of the answers because of your preparation. Your ability to respond to class discussions should also be an indicator. I am trying to provide you with a "safe" opportunity to learn and receive credit for your effort, so do not memorize the answers. It will be a waste of your time since they will be forgotten quickly after the exam.

Note that the answers to the questions given in the text will be the only ones that will receive credit on the final. Saying that you do not understand questions and do not agree with answers will simply be strong documentation that you did not study as you should have. There are a few corrections: On page 725, the answers to the Chapter 2 questions are 1, c; 2, a; 3, d: 4, b; 5, c; 6, a; 7, c. On page 726, the answer to question 9 in Chapter 15 is a. If you choose the incorrect answers given in the text to any of these questions that may happen to be on the final, it will provide evidence that you did not even read the syllabus.

Bibliographic Annotation (5%)

The specifications for the Bibliographic Annotation are described later, in the section entitled "Bibliographic Annotation". Both a computer disk copy and hard copy, or electronic mail copy of your annotation are required. Satisfactory work will receive full credit. I will tell you what needs to be done to complete any unsatisfactory work, time permitting.

Attendance and completion of in-class exercises April 28/May 2 (5%)

There are a few follow-up evaluative exercises which you will need to be available for at the end of the course. It is very important that you contribute to the course in this way. These functions are important enough for evaluation and research purposes to assign them 5% of the credit to be awarded in the class. Please plan to participate.

Grading Scale

90-100	A
80-89	B
70-79	C
60-69	D
Below 60	F

In a Nutshell Summary

I. Grant proposal (24%)
   - A. Think of a topic.
     1. Consider your interests.
     2. Consider sample topics.
   - B. Follow model for a proposal.
     1. Use generic model, OR
     2. Use actual grant application.
        - a. See funding agencies to consider
        - b. Ask school or agency officials for calls for proposals
   - C. Read in research book about elements of the proposal model or application form.
   - D. Last day to submit work is April 28/May 2, 1997.

II. Participation (16%)
   - A. Stay in regular communication.
     1. Check your mail.
     2. Critique proposals and papers.
   - B. Send your critiques to EDFN730302.
   - C. Discuss responses electronically with classmates.
   - D. Attend class on April 28/May 2, 1997.

III. Final examination (50%)
   - A. Study material in text.
   - B. Quiz yourself using the Self-Check Tests.
   - C. Final exam is on April 28/May 2, 1997.

IV. Bibliographic annotation (5%)
- A. See examples in annotated bibliography.
  1. Consider the research articles and texts to help learn terms and concepts for better critiquing of proposals and papers and for preparation for the final.
  2. Consider the grant-writing articles and texts to help with your grant-writing
- B. Use APA style.
- C. Last day to submit work is April 28/May 2, 1997.

V. Attendance and completion of in-class exercises April 28/May 2 (5%)
- A. Posttest
- B. Class evaluation form
- C. Departmental evaluation form
- D. Final exam

XIII. Class Policies

Assignments are sometimes rewritten more than once before being accepted, in which case acceptance is determined from the latest revision, not the original. If acceptance is not reached, then a lower grade will be awarded. Early submissions are strongly encouraged.

XIV. Class Schedule

January 13	a.	Introduction, activities, pretest
	b.	Assignment: Topic selection and read the WhatToDo file
January 20 (Optional)	a.	Activities
	b.	Assignment: Topic selection, read course outline
January 20-February 9	a.	Critique proposal #2.
	b.	Work on assigned activities/projects.
February 10-March 2	a.	Critique paper #1.
	b.	Work on assigned activities/projects.
March 3-March 30	a.	Critique paper #2.
	b.	Work on assigned activities/projects.
March 31-April 20	a.	Critique paper #3.
	b.	Work on assigned activities/projects.
April 28 (Mon.) or May 2 (Fri.)	a.	ALL STUDENTS NEED TO ATTEND. Final exam day
	b.	ALL WORK MUST BE COMPLETED AND SUBMITTED BY THIS DATE.

Analysis of Covariance Report

Page	1
Database	C:\WPDOCS\CONFS\MSERA\MSERA97\MSERA97B.S0
Time/Date	02:56:59 10-27-1997
Response	Posttest

Expected Mean Squares Section

Source Term	DF	Term Fixed?	Denominator Term	Expected Mean Square
A (Elec/Trad)	1	Yes	S(A)	S+sA
S(A)	105	No		S

Note: Expected Mean Squares are for the balanced cell-frequency case.

Analysis of Variance Table

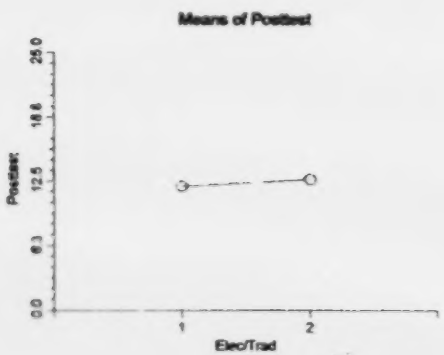
Source Term	DF	Sum of Squares	Mean Square	F-Ratio	Prob Level	Power (Alpha=0.05)
X(Pretest)	1	325.0023	325.0023	28.25	0.000001*	0.999483
A (Elec/Trad)	1	10.48061	10.48061	0.91	0.342060	0.156046
S	105	1208.069	11.50542			
Total (Adjusted)	107	1538.667				
Total	108					

* Term significant at alpha = 0.05

Means and Standard Error Section

Term	Count	Mean	Standard Error
All	108	12.33965	
A: Elec/Trad			
1	73	12.00592	0.3969994
2	35	12.67338	0.5733466

Plots Section



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